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Planck 2015 results: XXVII. The second Planck catalogue of Sunyaev-Zeldovich sources

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Abstract

© 2016 ESO.We present the all-sky Planck catalogue of Sunyaev-Zeldovich (SZ) sources detected from the 29 month full-mission data. The catalogue (PSZ2) is the largest SZ-selected sample of galaxy clusters yet produced and the deepest systematic all-sky surveyof galaxy clusters. It contains 1653 detections, of which 1203 are confirmed clusters with identified counterparts in external data sets, and is the first SZ-selected cluster survey containing >103 confirmed clusters. We present a detailed analysis of the survey selection function in terms of its completeness and statistical reliability, placing a lower limit of 83% on the purity. Using simulations, we find that the estimates of the SZ strength parameter Y5R500are robust to pressure-profile variation and beam systematics, but accurate conversion to Y500 requires the use of prior information on the cluster extent. We describe the multi-wavelength search for counterparts in ancillary data, which makes use of radio, microwave, infra-red, optical, and X-ray data sets, and which places emphasis on the robustness of the counterpart match. We discuss the physical properties of the new sample and identify a population of low-redshift X-ray under-luminous clusters revealed by SZ selection. These objects appear in optical and SZ surveys with consistent properties for their mass, but are almost absent from ROSAT X-ray selected samples.

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Keywords

Catalogs, Cosmology: observations, Galaxies: clusters: general